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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,728	04/03/2006	Xianghua Zhang	126539	7746
25944	7590	10/17/2007		
OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850			EXAMINER PARVINI, PEGAH	
			ART UNIT 1793	PAPER NUMBER
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/562,728

Applicant(s)

ZHANG ET AL.

Examiner

Pegah Parvini

Art Unit

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11, 15-20, 23, and 25 is/are rejected.
- 7) ☒ Claim(s) 12-14, 21 and 22 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-11, 15-20, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 7,143,609 to Aitken et al.
3. Regarding claims 1-3, 7, 10, 15, 20 and 25, Aitken et al. teach that chalcogenide glasses that in their glass-forming matrix, there exists a chalcogen element, such as one from sulfur group (e.g., S, Se, or Te), in stead of oxygen; in addition, Aitken et al. disclose that other elements such as antimony, germanium phosphorous, gallium, indium, etc may also be added (column 6, lines 54-60). Moreover, the reference discloses that chalcogen elements may be mixed with halide (fluorine, chlorine, bromine, iodine) to create chalcogen halide glasses (column 6, lines 60-64). Additionally, Aitken et al. disclose chalcogenide glasses containing about 0-35% Ge, about 0-55% As, about 30-85% S in which chlorine (Cl), bromine (Br), and iodine (I) may be added as well (column 8, lines 25-34). Furthermore, the reference discloses that other elements such as rare earths or fluxes (e.g., Li, K, Na) may be also added (column 8, lines 31-34).

It is noted that there is overlapping ranges between the disclosed amounts and the instantly claimed ones, and overlapping ranges have been held to establish prima facie obviousness. See MPEP § 2144.05.

Although Aitken et al. does not expressly disclose an amount of 2-25% of MX wherein M represents at least one metal chosen from Rb, Cs, Na, K and Zn and X represents at least one chlorine, bromine or iodine atom, the reference clearly disclose the use of both, some of said metals, and some of said halides in chalcogenide glasses. Therefore, it would have been obvious for said chalcogenide glasses to contain at least about 2% or 3% of such combination (MX) in said glasses.

With reference to the existence of less than 1% Ga, and between 0-6% of Ln and between 0-30% of adjuvant, since the instant claims recite the language of "less than" or display amount of zero (0) in defining the amount of these components, the fact that Aitken et al. do not specifically and expressly disclose an amount for the above mentioned components is seen to read upon the ranges instantly claimed. In re Mochel, 176 U. S. P. Q. 194 (CCPA 1972).

4. Regarding claim 4, Aitken et al. disclose a germanium content of 0-35% (column 8, lines 25-30).

5. Regarding claim 5, Aitken et al. disclose about 30-85% of sulfur in said chalcogenide glasses (column 8, lines 25-28).

Art Unit: 1793

6. Regarding claim 6, Aitken et al. teach the use of 0-55% of As in said chalcogenide glasses (column 8, lines 25-28).
7. Regarding claim 8, Aitken et al. do not disclose any rare earth metal, which seems to read on the instant claims claiming a range of from zero (0) to 3%.
8. Regarding claims 9 and 11, Aitken et al. further disclose the addition of certain elements such as Te (Tellerium) to modify the optical, thermal, and/or mechanical properties of said glasses (column 8, lines 25-34). With reference to an amount of 0 to 10 mol%, it would have been obvious to have an amount of such adjuvant within the instantly claimed ranges, specially because the range includes the value of zero (0).
9. Regarding claim 20, Aitken et al., as described in details above, disclose a chalcogenide glass composition having Ge, Ga, S+Se, Sb+As, MX, Ln and adjuvant in an amount within the claimed ranges. Aitken et al., although disclosing heat treatment, do not disclose any treatment that would result in a crystalline form of the composition; therefore, it is seen to read upon the limitations of claim 20.
10. Regarding claim 25, Aitken et al. disclose that said chalcogenide glass which exhibit excellent optical transparency in the near and far infrared (IR) spectral region (>700 nm) which is used in optical telecommunication, as a guidance in the nose of a missile and more (column 7, lines 4-25).

11. Regarding claims 16-19 and 23, it known in the art and would have been obvious to obtain any crystal size by modifying the time and temperature of the heat treatment of the glass motivated by the fact that Kuo et al., which is drawn to the use of glass-ceramic substrate, disclose that conventional glass ceramic articles are formed by crystallization of a glass article through heat treatment in which the growth of the crystals is controlled by controlling the time and temperature during the process of crystallization (column 6, lines 16-30).

12. Claims 1-2, 4-7, 8-9, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,128,429 to Cole et al.

13. Regarding claims 1-2, 4-6, 8-9 and 15, Cole et al. disclose an infrared transmitting chalcogenide glass based on germanium, arsenic, gallium, selenium and a rare earth (column 2, lines 61-68). More specifically, Cole et al. disclose a glass composition with 0.1-30 wt% of germanium (Ge), 0-40 wt% of arsenic (As), 0.01-20 wt% of gallium (Ga), 40-85 wt% of selenium (Se), and 0.001-2 wt% of rare earth, RE (column 2, lines 20-35). Taking, for example, 20 wt% of Ge, 19 wt% of As, 0.2 wt% of Ga, 63.1 wt% of Se, and 0.1 wt% of rare earth, mole percents of 20.67, 19.04, 0.215, 60.02, and 0.037 are obtained for the above components respectively. In addition, the reference discloses that a halogen or a mixture thereof, particularly iodine in an amount of up to

Art Unit: 1793

20% on mol basis of the glass components, may be added to said glass composition to modify refractive index and increase rare earth solubility (column 2, lines 51-55).

Furthermore, Cole et al. teach the use of up to 2 mol percent, based on the glass components, of, for example, cesium and halides to make some improvements (column 2, lines 56-60).

With reference to "Ln" and adjuvant, it is noted that since the instant claims recite the language of "less than" or display amount of zero (0) in defining the amount of these components, the fact that Cole et al. do not specifically and expressly disclose an amount for the above mentioned components is seen to read upon the ranges instantly claimed. In re Mochel, 176 U. S. P. Q. 194 (CCPA 1972).

14. Regarding claim 7, Cole et al. disclose an amount of up to 2 mol percent of components such as cesium and halides as well as disclosing the use of, particularly, iodine amongst halides (column 2, lines 50-60).

15. Regarding claim 20, Cole et al., as described in details above, disclose a chalcogenide glass composition having Ge, Ga, S+Se, Sb+As, MX, Ln and adjuvant in an amount within the claimed ranges. Cole et al., although disclosing heat treatment, do not disclose any treatment that would result in a crystalline form of the composition; therefore, it is seen to read upon the limitations of claim 20.

Art Unit: 1793

16. Claims 1-2, and 4-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,389,584 to Aitken et al.

17. Regarding claim 1-2, and 4-11, Aitken et al. teach transparent glass composition exhibiting great thermal stability containing arsenic, germanium, gallium and sulfur with minor amounts of other glass modifiers such as Li, Na, K, a rare earth metal of the lanthanide series and more (Abstract; column 2, lines 50-65). In addition, Aitken et al. disclose 55-95%  $\text{GeS}_2$ , 2-40%  $\text{As}_2\text{S}_3$ , 0.01-20%  $\text{R}_2\text{S}_3$  where R could be gallium wherein the "%" are in mole percents; changing the mole percents from sulfide basis to one which is based on each component (and selecting a value within disclosed range, for example, 55 mole Ge, 116.03 mole S, 10 mole As, and 0.02 mole Ga) and obtaining the new mole percentages would results in 30.37mol% of Ge, 64.08 mol% of S, 5.52 mol% of As, 0.01 mol% of Ga which fall within the claimed ranges.

With reference to "Ln", rare earth metals, Aitken et al. disclose the use of minor amounts of other glass components such as lanthanides (column 2, lines 60-65).

With reference to adjuvant, Aitken et al. disclose the use of minor amounts of Ca, Ba, Pb, Ag, and Cd (column 2, lines 59-65).

With reference to MX, it is noted that Aitken et al. disclose the use of minor amounts of components such as K, Li, Na and more; in addition, the reference discloses the use of at least one halide selected from the group consisting of chloride and fluoride (Abstract; column 2, lines 59-65). Therefore, it would have been obvious to have a minor amount of MX such as about 2 mol% or 3 mol%. Furthermore, it would have

Art Unit: 1793

been obvious to have an amount of 0-30 mol% of adjuvant as claimed in claims 1 and 11.

### ***Response to Amendment***

18. Applicants' amendment to claim 23, filed on August 1, 2007, by deleting the dependency of said claim upon claim 1 is acknowledged. As such, the objection to said claim as set forth in the previous Office Action is hereby withdrawn.

19. Applicants' cancellation of claim 24, filed on August 1, 2007 is acknowledged. As such the rejection of said claim under Title 35 USC 112 second paragraph as set forth in the previous Office Action is hereby withdrawn.

### ***Response to Arguments***

20. Applicant's arguments with respect to claims 1-11, 15 and 20 as having been rejected under Title 35 USC 102(e) have been considered but are moot in view of the new ground(s) of rejection.

21. Applicants have argued that elements three different types of glasses, as disclosed by Aitken et al. (US Patent No. 7,143,609) namely chalcogenide, chalcohalide, and halide, have been used to reject said claims.

The examiner, respectfully, submits that chalco-halide glasses are very similar to chalcogenide glasses with the exception that they, further, comprise Cl, Br, and/or I as

Art Unit: 1793

pointed out by the applicants as well (page 8, reply filed August 1, 2007). Nevertheless, the new ground(s) of rejection as set forth in this Office Action relies only on chalcogenide glasses of Aitken et al.

***Allowable Subject Matter***

22. Claims 12-14 and 21-22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: Although the prior art may disclose the use of antimony, sulfur and cesium, they do not disclose a combination of specifically 15-30 mol% of Ge, 4-20 mol% of Sb, 50-70 mol% of selenium, and 3-15 mol% of cesium halide. More specifically, the prior art do not disclose a combination of Ge, Sb, S, and CsX (X is halide) in amounts as recited in claim 13. Furthermore, the prior art do no disclose any of the above combinations along with adjuvant such as PbI<sub>2</sub>, CuI, Ag<sub>2</sub>Se, and CdTe in an amount from 1-7 mol%.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pegah Parvini whose telephone number is 571-272-2639. The examiner can normally be reached on Monday to Friday 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1793

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PP

  
J.A. LORENZO  
SUPERVISORY PATENT EXAMINER